

BRIEFER ARTICLES

HELMUT BRUCHMANN

(WITH PORTRAIT)

The name of BRUCHMANN has become so familiar through his indefatigable researches upon the prothallia of temperate species of *Lycopodium*, that some account of his life should appear in this journal, which has so often paid the last tribute of respect to great botanists.

HELMUT BRUCHMANN was born in Pomerania, Prussia, on November 13, 1847, and death came suddenly at Gotha on Christmas 1920.

After the usual studies in local schools, he went to Jena, where STRASBURGER was beginning his great career as a teacher, investigator, and maker of investigators. Although I cannot find any authoritative data, it is my recollection that STRASBURGER himself told me that BRUCHMANN was the first man to take the Ph.D. degree under his direction, and that the thesis dealt with *Lycopodium*. STRASBURGER held him in the highest esteem and made him his assistant. Like STRASBURGER, he was a master of technique, making splendid sections before the days of paraffin and microtomes. In 1878, at the age of 29, he went to



Tharand to deliver a course of lectures on forestry; and a year later was called to Gotha as teacher of mathematics and physics, and afterward biology, in the high school. STRASBURGER offered him an "ausserordentlich" professorship at Jena, but the stipend attached to that position at that time was so small that he felt compelled to remain at Gotha, with the comparatively comfortable salary of 2400 marks. Since BRUCHMANN married Fräulein EMMA JUSATZ in 1880, one might

surmise what prompted the decision. She shared, in an unusual degree, the cares and joys of his school life, and was intimately acquainted with his investigations and discoveries. For thirty years he taught mathematics and physics in the high school at Gotha, spending vacations and leisure hours in his patient and thorough investigations of *Lycopodium*. He was a successful teacher, reaching the highest rank in the school and often assuming the duties of Director. His thorough knowledge of his subject, together with a kindly, sympathetic disposition, won for him the respect and affection of his students. In 1905 his health became impaired, and he went to the Riviera to recuperate; but after several months, not feeling strong enough to resume the heavy burden of teaching, he retired upon a pension. In 1907, he visited Sicily, Tunis, and Algiers. In his later years, failing eyesight made the search for subterranean prothallia very difficult.

BRUCHMANN'S great contribution to science was his prolonged and successful investigation of the prothallia of the European species of *Lycopodium*. When he began his studies, nothing was known of the prothallia of temperate species except fragmentary accounts of the aerial prothallia of *L. inundatum* and the subterranean prothallia of *L. annotinum*. BRUCHMANN succeeded in finding practically complete series in the development of the prothallia of *L. complanatum*, *L. annotinum*, *L. clavatum*, and *L. Selago*; and his excellent histological technique and his skill as an artist, together with a clear literary style, enabled him to make an effective presentation of his researches and conclusions. Altogether there are 17 papers, but the most important are "Über die Prothallien und die Keimpflanzen mehrerer Europäischer Lycopodien," an extensive account with 199 pages and 8 plates, which appeared in 1898; and "Die Keimung der Sporen und die Entwicklung der Prothallien von *Lycopodium clavatum*, *L. annotinum*, und *L. Selago*," which appeared in *Flora* in 1910.

Although botanists, from the time of HOFMEISTER, have tried to germinate the spores of *Lycopodium*, no one but BRUCHMANN ever succeeded with the difficult species which have subterranean prothallia. Some may have failed by throwing away their cultures too early, for the spores of *L. Selago* germinated in 3-5 years; the development of archeogonia and antheridia was complete only after 6-8 years; while *L. clavatum* and *L. annotinum* were even slower, germinating after 6-7 years, and requiring 12-15 years to produce an egg ready for fertilization. A long series of cultures in the laboratory, with checks in the field, finally enabled him to give a complete account of the germination of the spore,

development of the gametophyte, fertilization, and embryogeny. BRUCHMANN'S success stimulated others, and while no one else found any prothallia of European species, SPESSARD found American species, HOLLOWAY found prothallia of New Zealand species, while both HOLLOWAY and LAWSON discovered the prothallia of *Tmesipteris* and *Psilotum*.

BRUCHMANN naturally became interested in other subterranean prothallia, and succeeded in finding prothallia of *Ophioglossum vulgatum* and *Botrychium Lunaria*, both of which he described in his usual thorough manner. *Selaginella*, since it is a lycopod, was investigated, although its prothallia are not subterranean. He also made a study of the behavior of the sperms of lycopods with special reference to chemotaxis.

The paper of 1898 brought widespread recognition, for in 1899 he received the Plato Medal of the Academy of Science of Munich, and in the following year the Demazières Prize of the Paris Academy of Sciences, which carries with it a monetary consideration of 1500 francs. Still later he was made an honorary member of the Naturforschende Gesellschaft of Berne. In a letter received by the writer in 1911, however, BRUCHMANN states that, while the prizes are gratifying, his greatest satisfaction is in the recognition his work is receiving in textbooks which bring his results before students in the schools. His experience as a teacher prompted him to prepare splendid sets of prothallia for laboratory demonstration, and these are now used in most German universities and in many universities of other countries.

BRUCHMANN'S life and patient, persistent work prove that one who has the interest and will to do research work can achieve a high rank in science without the stimulus of a great university.—CHARLES J. CHAMBERLAIN, *University of Chicago*.